

MARINE REVIEW.

VOL. X.

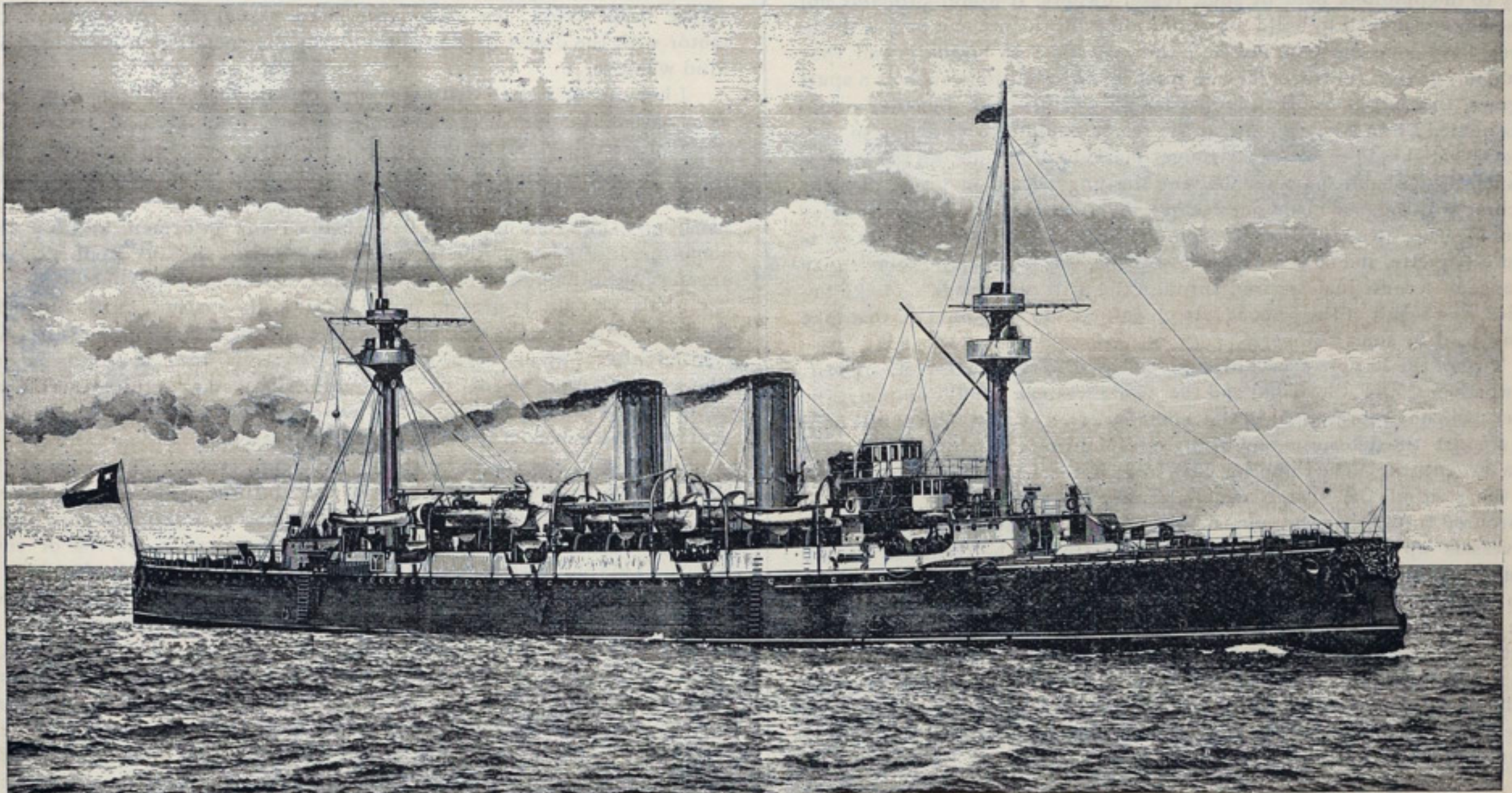
CLEVELAND, O., SEPTEMBER 20, 1894.

No. 12.

Something About Capt. Lundborg.

A story that will interest ship builders and naval architects in this country, as well as their competitors on the other side of the Atlantic, is found back of the simple announcement that Charles G. Lundborg of New York has brought suit against the William Cramp & Sons Ship and Engine Building Company of Philadelphia, for \$300,000, for infringement of patents covering a certain form of hull construction in the new American Line steamers St. Louis and St. Paul. Capt. Lundborg is not very well known in this country outside of the circle of naval experts that centers around the works of the Cramps, and his peculiar connection with the International Navigation Company and the Philadelphia firm of ship builders is probably more interesting than anything that might be said of his right to patent claims on certain details in ship construction. He is a native of Sweden and about sixty-seven years of age. He was a contemporary of Ericsson, and at one time held a position of high rank in the navy of his country. His first engineering feat, and one that brought him into prominence, was the raising of several ships for the Sultan of Turkey during or some time after the Crimean war. He had been knighted

London a propeller designed by him, and it was tried on the New York on one westward trip. On the entire run the ship's time was fully $1\frac{1}{2}$ knots per hour behind the average. A cofferdam was constructed around the stern of the New York on her arrival here, and the propeller taken off immediately. With this failure, all relations between Capt. Lundborg and the Philadelphia owners and builders were closed. It is understood, however, that through a 25 per cent. advance on the sum of money that was to have been paid to him in event of the propeller proving a success, and also through a liberal salary during employment, Capt. Lundborg was pretty well paid for his time, and it is this that probably caused Mr. Charles Cramp to be so emphatic in saying, when the suit was brought a few days ago, that "this was not the first time his firm had heard of the captain." The form of stern construction on which patent infringement is charged is practically the same as that adopted by Harland & Wolff in the Majestic and Teutonic, and Capt. Lundborg has complained bitterly in the past of the Belfast people, as he now complains of the Cramps. The shape of that part of the hull in which the shafts are carried is rather of this Y form than that of a V, thus permitting of the shafts being carried within the hull and admitting of ready access to them at all times.



A CHILIAN CRUISER—ONE OF THE FASTEST IN THE WORLD.

and otherwise honored before taking up a residence in New York. Some six years ago he made the acquaintance of leading officers of the International Navigation Company and the Cramp company, and was regarded by them as a man of high scientific attainments.

When it was decided, about two years ago, to build the new American Line ships in Philadelphia, Capt. Lundborg applied for an opportunity to demonstrate his ability, and after a lengthy correspondence he was employed by the International company, at a fixed salary, to design a vessel, with the understanding that if his design was accepted he was to be paid a large sum of money. Like Professor Biles, who was employed by the Philadelphia ship owners to superintend the construction of the Paris and New York, he saw the Cramps go ahead with the present ships, disregarding his ideas in almost every particular, and his relations between owners and builders were not of a most pleasant kind.

Capt. Lundborg's claim was that he would design a ship in which every square foot of surface was so proportioned that resistance would be at the minimum, but his patent claims related as well to arrangements of multiple screws, some of them covering as many as six screws for a ship. It was a practical application of one of his propeller designs to the New York that suddenly terminated, something more than a year ago, his connection with the Philadelphia people. They had built by Parsons of

One of the Fastest Cruisers Afloat.

A cruiser built in England for the Chilean government, and capable of a speed of nearly 23 knots under most favorable conditions, is illustrated on this page. The ship was built by Armstrong, Mitchell & Co., one of the leading firms of British builders, and is named Blanco Encalada. The illustration is taken from the Engineer of London. The Blanco Encalada's principal dimensions are: Length, 370 feet; breadth 46 feet 6 inches; mean draught, 18 feet 6 inches; and her displacement is 4,500 tons. Speed trials of this vessel showed that she could run with forced draught at a speed of 22.78 knots, and that she could run as long as her coal supply lasted, with natural draught, at a speed of 21.75 knots. Her normal supply of coal is 350 tons, but she can carry 900 tons. With her bunkers full, the above speeds would be somewhat reduced; but starting with her full coal supply she could steam at, say, the mean speed $21\frac{1}{2}$ knots, for eighty-four hours, and would cover a distance of 1,800 knots, while at the economical speed of 12 knots she could steam for twenty-eight days, and cover a distance of 8,000 knots. The vessel is sheathed with wood and coppered. She has an inner bottom throughout. Her armament consists of two 8-inch breech-loading guns, two 6-inch quick-firing guns, twelve 3-pounder quick-fire guns, twelve 1-pounder guns, two Gatling guns, and five torpedo tubes.

Fall Outlook In Lake Freights.

Although advances recorded in lake freights during the past two or three weeks have all been maintained, the market has now reached a point of uncertainty, and both vessel owners and shippers are agreed that there is little prospect of higher fall freights unless the movement of grain to the seaboard shows a decided improvement. Within the past few days the demand for vessels to take ore from the head of Lake Superior at 85 cents has not been very urgent, and as a result of claims made by leading ore companies, that they were practically out of the market as far as wild shipments were concerned, two or three firms controlling considerable vessel property have been satisfied with providing enough ore for their boats at 85 cents to carry them through the season. Business of this kind is, of course, not of great extent, but it tends to show the feeling among some owners who are satisfied to take some ore at a moderate freight, rather than trust to the chances of grain moving in large quantities. On the other hand, the active resumption of work in the furnace districts, where pig iron is being made in quantities almost equal to the highest production of the early part of 1893, will tend to relieve, in a large measure, the crowding of docks at Lake Erie ports, on account of direct shipments to furnaces, and this will also be an incentive to bringing down more unsold ore than was expected.

But the grain market is still the key to the situation. As yet the export demand has been only spasmodic, and on the question of farmers selling their grain at the prevailing low prices, advices from shipping points are no more definite than the probabilities of a demand. Dollar ore late in the season would not prove a great hardship to the leading producers, who have already moved the bulk of their product, and contrary to the opinions held by some vessel owners, it would probably not cause any great rush to build ships, for after all, the ore companies themselves have done most to increase the lake fleet by building, and they would not go into contracts for new tonnage on conditions, such as a spurt in grain, that might result in higher freights being paid. But they would be benefited by an advance now, as the result would be a stiffening of conditions that should result in a stronger market for ore during the winter. It is hardly probable, however, barring the unexpected in grain, that the outcome will thus be made satisfactory to all interests. Ore rates today (Thursday) are steady at 85 cents from the head of Lake Superior, 70 cents from Marquette, and 50 cents from Escanaba, the latter rate including an advance of 5 cents just secured through the drift of tonnage to Lake Superior, as a result of the 50-cent rate on soft coal to all points on that lake being paid by some shippers.

Two of the largest firms shipping soft coal to the northwest, Morris, Elsworth & Co. of Cleveland and the Northwestern Fuel Company, the latter company represented in Cleveland by Mr. A. C. Saunders, still hold out against the determination of the vessel owners to take nothing less than 50 cents on Lake Superior coal, but there are no signs of weakness on the part of the vessel owners, as they are taking such coal as can be secured from other shippers at the fixed rate and sending Lake Superior vessels up light in cases where cargoes can not be secured. At the regular meeting of the owners on Wednesday it was agreed to continue into next month the agreement that has held out during September. The coal shippers who refuse to pay the fixed rate claim that large stocks of coal will not be wanted in the northwest during the coming winter, and in providing for a movement of at least 500,000 tons that must be made to Lake Superior during October and a part of November they have evidently pinned their faith to expectations of a flattening out of down freights.

Conneaut-Port Dover Car Ferries.

The new Conneaut-Port Dover car ferries, to be built by a company organized by Col. Dick, president of the Pittsburgh, Shenango & Lake Erie Railway Company, will, if constructed according to plans prepared by Frank E. Kirby of the Detroit Dry Dock Company, be among the largest in the world. The boat designed by Mr. Kirby is 350 feet over all, 56 feet beam, 20 feet deep, moulded, and 27 feet deep from the upper deck to the bottom of the hold, and will be of steel up to the top of her rail, with wooden upperworks. She will carry—on her main deck—thirty of the regular 30 or 34-foot cars, and they will be loaded at the stern and on deck will be completely housed in. At the bow she will be closed in and at that point will have the same appearance as the regulation steamer. Ample accommodations for the officers and crew will be provided on the upper deck.

The boat will be driven by twin triple expansion engines, which, combined, will develop 2,000 horse power. The cylinders will be 18½, 30 and 50 by 36 inches stroke. Steam will be furnished by four cylindrical boilers and the Howden hot draft system will be applied. Light will be furnished by 350 16-candle power electric lights, and she will have a 6,000 candle power search light. An improvement will be a water tank built crosswise into the hull, to be partly filled with water, the counteracting motion of which will steady the boat in a heavy sea. These tanks are used in modern warships, with a view to giving them a steady deck when in battle in a

seaway. She will in no way resemble any car ferry now in existence, but with her two smokestacks, set fore and aft amidships, will look more like an ocean-going steamship.

As noted elsewhere, bids on two boats of this type are now being received in the company's office at New York. They are intended to carry freight and passenger cars between Conneaut, O., and Port Dover, Ont., in connection with the Pittsburgh, Shenango & Lake Erie road at the former port and the Grand Trunk at Port Dover. The run each way will be about 50 miles, and the difficulty from ice will, of course, not be so great as that encountered by boats in the Straits of Mackinaw or on Lake Michigan.

The Steamship Great Britain.

Editor MARINE REVIEW: Pardon me for calling attention to the article in the REVIEW of Sept. 6, relating to the steamship Great Britain, but in some respects I deem it misleading. Your article says: "The pair of direct acting engines etc., etc.," and yet interposes drums and chains between the motor and the propeller shaft. I have always supposed it improper and misleading to refer to engines as being direct acting, when gearing, drums or belts were interposed between the crank shaft of the engine and the object driven. A direct acting engine as technically termed is directly connected to the object driven, without the interposition of gears, drums or belts. An engine may be plain direct acting, or direct acting back action, that is, the piston rod and connecting rod may be on one side of, or over, or under, the crank; or the piston rods (two or more) may pass on each side of the crank shaft and take hold of a cross-head beyond it, and the connecting rod return to the crank. In the former case it is a plain direct acting engine and in the latter a direct acting back action. In either case there is a direct connection of the motor with the object driven, without the interposition of gearing of any kind whatever.

I became connected with steam vessels in 1855, and first went to sea as an assistant engineer in the early part of 1857. My first recollection of the steamship Great Britain was prior to my connection with shipping—either in 1853 or 1854. I have been on board of her many times in the fifties and again in later years and have never known her with any other machinery than that hereafter described. I was informed, however, that sometime in the last of the forties or early fifties she was fitted with new engines, the old ones being too large and otherwise unsatisfactory.

I have no data at present in relation to the matter, but I am under the impression that the new engines were substituted when the vessel was refitted after having been stranded (I think in 1846) in Dundrum bay. She was gotten off in 1847 or 1848, and I am of the opinion that it was some considerable time before she was again sent to sea, and that during that time the new engines were put in the vessel.

The new engines were built by John Penn & Son. They were of the two-cylinder, oscillating type, geared one to three. The cylinders were 82½ inches in diameter and 6 feet stroke of piston. Cylinders were placed directly under the crank shaft, on which there was a mortise or shell wheel. This shell wheel had, to the best of my recollection, four sets of step teeth, that is, there was a series of four sets of wooden cogs set in advance of, or out of line with each other, gearing into a pinion or series of pinions on the propeller shaft, set in the same way, the result being a smooth and steady motion with the minimum of backlash. Of the first engines placed in the ship, I know nothing personally, but, until I saw your article, I was under the impression that they were of the same general type as those substituted. Your article may be intended for a description of the first machinery placed in the ship, but it is not a description of the engines that made her a successful screw steamer. I find from data that she was still running in 1884.

R. CHESTNUT.

OSWEGO, N. Y., Sept. 17, 1894.

Considering the Construction of Tow Barges.

Mr. L. C. Hanna, president of the Mutual and Menominee transportation companies, says that he has given some thought to the matter of constructing probably three steel barges to tow with the three steamers of the former company and six steamers of the latter, but as yet the subject has not been submitted to the directors and is entirely in embryo. The construction of one barge for the Mutual steamers and two for those of the Menominee line was considered some time ago, when it was thought the boats would run entirely in the Escanaba trade, but a change of conditions relating to the operation of the Chapin mine put an end to these plans. The question again comes up as a result of the action of the Minnesota company in letting a contract for two barges. If barges for the Menominee and Mutual lines are built the contract will, of course, go to the Globe Iron Works Company of Cleveland, on account of close relations between the firm of M. A. Hanna & Co. and the Globe company. Action of this kind on the part of owners in the two lines referred to, would not, however, be due to a favorable view of the freight outlook, but rather to the question of economy in carrying charges involved, and to the relations existing between the builders and owners.

Against Bridge Piers in Rivers.

Again a board of army engineers has reported against constructing a bridge pier in the center of a great highway of water commerce, and the shipping interests of the country have reason to feel grateful for the government rule of recent years giving the war department certain powers in the matter of bridges. The report to the secretary of war of the board of engineers appointed to recommend what length of span, not less than 2,000 feet, would be safe and practicable for a railroad bridge over the north river at New York has been given out, and it does not agree with plans of the bridge company for the construction of a pier in the river. It is in favor of a suspension bridge, which is perfectly feasible, and it is stated would not differ materially from the former in the matter of cost.

All of the plans for Hudson river bridges at New York, to which consideration has been given, are for high bridges, permitting of the largest vessels passing under them, so that the important question with the government engineers has been that of piers in the river. For the bridge now under consideration, which is to span North river between Fifty-ninth and Sixty-ninth streets, the board considered four plans, as follows:

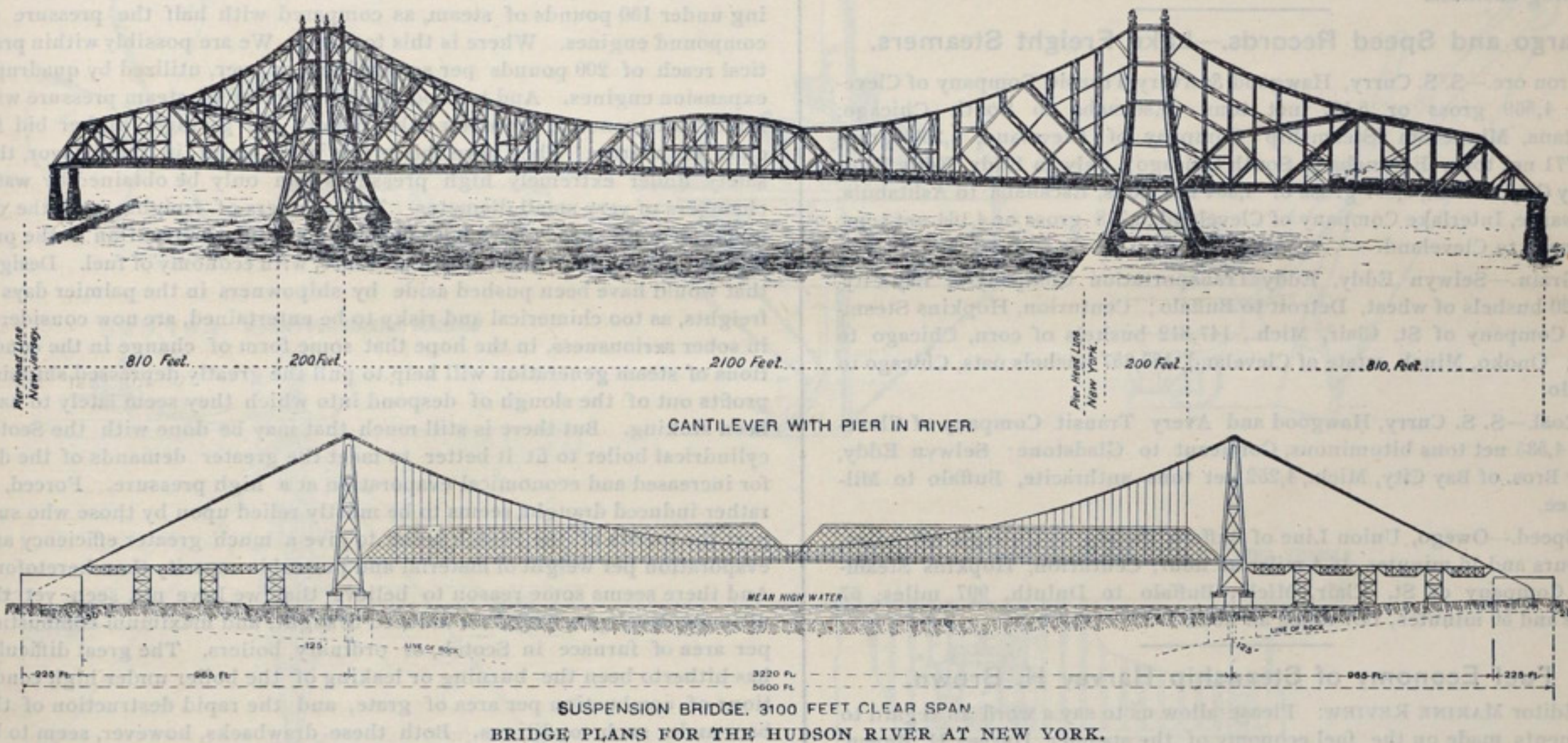
2000-foot cantilever, costing.....	\$25,443,000
3100-foot cantilever, costing	51,128,000
3100-foot suspension, costing	35,367,671
Lighter suspension, same plan, costing	30,743,000

The engravings on this page, which were reproduced from the Iron Age of New York, give first a perspective view of a model of a design by

Canada's Claim to the First Steamboat.

It was early in the year 1833 that the first steamship was propelled all the way across the Atlantic by steam, and if anyone had then expressed the belief that the distance would some day be covered in five days, he would have been regarded as at least visionary of the most pronounced type. A little over fifty years before, John Mason of Boston sent an almost undecipherable scrawl to Benjamin Franklin the then "president" of Pennsylvania, stating therein that he had constructed a boat that would, to use his own words, "move or advance with a Sufficient Velocity—without Sails or Oars. The above is on a Small Scale and Sd. Mason propose's to fit up or prepare a Shallop for the above purpose, provide'd a Subscriben Can be completed to Defray the Expence's, and Compensate him for his time, trouble and, for the Invention." It is said that from this little boat lay potential the steamers which are now astonishing humanity with their performances, and which were once described by Emerson in a lecture as enormous shuttles weaving the continents and islands of the earth into one great woof of human fraternity.

For some years it was impossible to learn from the meagre facts obtainable to what country belonged the honor of having built the first transatlantic steamer, but some few years ago conclusive evidence was found to substantiate Canada's claim. The Royal William was the name of the little vessel, and she was built at the Cove, Quebec, by Messrs. Shepherd and Campbell, during the winter of 1830-31. In the April following she was launched in the presence of the governor, Lord Gosford, and the military authorities, and made the passage wholly by steam from Halifax to London in August, 1833. She was afterwards sold to the



the bridge company for a cantilever bridge of 2,100 feet span with river pier; and second, a 3,100 foot suspension bridge. The conclusions of the government engineers regarding the four plans are as follows:

"The only subject referred to your board is to recommend what length of span not less than 2,000 feet, would be safe and practicable.

"A single span from pier head to pier head, built on either the cantilever or suspension principle, would be safe.

"The estimated cost of the 3,100-foot clear span cantilever being about twice that of the shorter span, your board considers itself justified in pronouncing it impracticable on financial grounds.

"As the cost of the single span suspension bridge is almost one third greater than that of the 2,000 foot cantilever, your board is unable to say that such greater cost is enough to render the suspension bridge impracticable.

"The board feels that the contingency attending the construction of the deep river foundation of the cantilever bridge, even waiving the absolute necessity of carrying this foundation to rock, is enough to balance a part of the greater cost of the suspension bridge. The conclusion of this board is that of a board of bridge engineers acting in a professional capacity. While from such professional view they must pronounce the suspension bridge practicable, they do not in this conclusion give an opinion on the financial practicability and merit of either plan."

Home Seekers' Excursion—Sept. 25 and Oct. 9. Ask agents of Nickel Plate road. 153-8

A remarkable reduction in rates has been made to points in the west for Sept. 25 and Oct. 9. Ask agents of Nickel Plate road. 154-8

Spanish government, and was the first war steamer to fire a hostile shot. The Great Western is, however, generally placed at the head of the list of record breakers. In 1838 she made the voyage from New York to Liverpool in about eighteen days, and her achievement was soon emulated by other vessels. Vast improvements were rapidly made, the most important, probably, being the substitution of the screw for the paddle, but it was not until the year of confederation that a record of less than nine days was made. Marvellous achievements in devouring distance have since been recorded, but there is no reason to doubt that the impossible will again be accomplished before the present generation takes its final voyage to "the undiscovered country, from whose bourne no traveller returns."—Toronto Mail.

At a launch in Camden, Me., a few days ago, instead of the usual christening ceremony, that of breaking a bottle of champagne over the bow, four young ladies covered the bow and deck with floral offerings while the ship was sliding into the water. The boat is a four-masted wooden schooner, 238 feet over all and of 1,571 gross tons. She was built by H. M. Bean of Camden for Capt. Amos Birdsall of Asbury Park, N. J., and was named J. Holmes Birdsall.

In 1890 Capt. James Reid tried air bags on the sunken steamer Armour at Southeast bend above the St. Clair flats, on practically the same plans that have caused so much talk about the operations of the wreckers now at work on the Chicago fire boat Yosemite. The scheme was a failure, and experienced wreckers on the lakes who were familiar with the operations on the Armour do not think well of the air-bag system.

Try No. 5.—Fast Nickel Plate train for Chicago and all points west.

Pig Iron Stocks.

Statistics regarding pig iron production on Sept. 1 show the effect of the resumption of work among the coke furnaces in the Mahoning and Shenango districts. On that date the coke furnace capacity active was 125,879 tons per week, against 94,707 tons on August 1. For the whole country the weekly production rose from 115,356 tons on August 1 to 151,113 tons on Sept. 1, the highest reached since July 1, 1893. Stocks of coke pig iron, sold and unsold, on Sept. 1 aggregated 197,877 tons, against 223,902 tons on August 1 and 231,430 tons on July 1. Stocks of pig of all kinds on Sept. 1 were 532,264 tons; on Aug. 1 they were 567,848 tons and on July 1, 573,985 tons. These figures as to stocks do not include quantities held by the large steel companies.

Iron Mining Matters.

Ore docks of the Milwaukee, Lake Shore & Western Railway at Ashland are to be raised, so as to overcome the difficulties encountered in loading big steel vessels. Gogebic ore companies that ship a large quantity of the best grades of Bessemer over this road have been at a great disadvantage in their dealings with vessel owners, on account of the better dispatch afforded at the new docks in Duluth and Two Harbors. It has been shown that the average time spent by vessels in loading at Ashland has been as days compared with hours, at other places, and the change is of course a matter of importance to all vessel owners, as well as the ore producers of the Gogebic range. Although plans for the dock improvements have not been given out as yet, it is, of course, to be expected that they will be on a scale suited to future requirements in the ore shipping business.

Cargo and Speed Records.—Lake Freight Steamers.

Iron ore.—S. S. Curry, Hawgood & Avery Transit Company of Cleveland, 4,569 gross or 5,117 net tons, Escanaba to South Chicago; Maritana, Minnesota Steamship Company of Cleveland, 4,260 gross or 4,771 net tons, Escanaba to South Chicago; Selwyn Eddy, Eddy Bros. of Bay City, Mich., 3,897 gross or 4,364 net tons, Escanaba to Ashtabula, Kearsarge, Interlake Company of Cleveland, 3,718 gross or 4,164 net tons; Escanaba to Cleveland.

Grain.—Selwyn Eddy, Eddy Transportation Company of Bay City, 130,820 bushels of wheat, Detroit to Buffalo; Centurion, Hopkins Steamship Company of St. Clair, Mich., 147,812 bushels of corn, Chicago to Erie; Onoko, Minch estate of Cleveland, 187,657 bushels oats, Chicago to Buffalo.

Coal.—S. S. Curry, Hawgood and Avery Transit Company of Cleveland, 4,535 net tons bituminous, Conneaut to Gladstone; Selwyn Eddy, Eddy Bros. of Bay City, Mich., 4,252 net tons anthracite, Buffalo to Milwaukee.

Speed.—Owego, Union Line of Buffalo, Buffalo to Chicago, 889 miles, 45 hours and 16 minutes, 16.4 miles an hour; Centurion, Hopkins Steamship Company of St. Clair, Mich., Buffalo to Duluth, 997 miles, 67 hours and 50 minutes, 14.7 miles an hour.

Fuel Economy of Steanship Harvey H. Brown.

Editor MARINE REVIEW: Please allow us to say a word in regard to comments made on the fuel economy of the steamer Harvey H. Brown. In your paper of Sept. 13 it is stated that it is no uncommon thing for ocean tramp steamers to get an I. H. P. per hour on 1.5 pounds of coal. This statement, in connection with the trial of the steamer Harvey H. Brown is very misleading. In trials of short duration on ocean steamers, with the best selected coal, they have gotten perhaps an I. H. P. on 1.5 pounds of combustibles, by deducting from the general results the expenditure of running auxiliary engines, etc. The steamer Harvey H. Brown is getting an I. H. P. per hour on 1.65 pounds of combustibles, and not taking into account the cost of running auxiliary machinery. This is what this steamer is doing commercially; not what she could do in a short trial under the most favorable circumstances.

Commodore Geo. W. Melville, engineer-in-chief, U. S. N., says in a paper read before the Society of Naval Architects and Marine Engineers: "We are all very familiar, doubtless, with the claim we constantly hear that a good triple expansion engine with high pressure boilers gives a horse power for 1.5 pounds of coal. Our own results have never approached this, and estimates of the coal burned on trial trips also tend to disprove this."

He gives the results in fuel economy of U. S. S. Charleston's engines, with power ranging from 107 to 6,120 I. H. P. and including fifteen trials, as 1.9 pounds per hour per I. H. P., and this was when engines were developing about two-thirds maximum horse power.

Detroit, Mich., Sept. 17, 1894. DETROIT DRY DOCK COMPANY.

Bids on one or two steel car transfer steamers for the new Conneaut—Port Dover service will be opened this week. The construction will be under the rules and inspection of the United States Standard Register.

Battle of the Boilers.

"The Scotch boiler will die hard, but it is bound to go," was the expression used, a few days ago, by one of the leading representatives of the Babcock and Wilcox Company, who had just finished a trip around the lakes in the interest of the marine tubulous boiler now being constructed by that firm. "The old boiler will hold on for a while" he continued, "because it has powerful advocates in ship builders whose interests in boiler making plants equipped for the present forms of construction will prevent them giving a favorable reception to any radical change in construction. But as it has been with the engines so it will be with the boilers, and the change will be just as rapid."

Of course the representatives of the Babcock and Wilcox Company, who have been in consultation with lake builders and owners, claim that their firm, with the great amount of money expended in experiments, and with the prestige which it holds among steam users throughout this country and Great Britain, secured the best type of tubulous boiler before entering the market, but it would probably be no exaggeration to say that at present every marine engine and boiler building firm in the country is directly or indirectly interested in the construction of, or experiments with, some form of water tube boiler to which they have pinned their faith, and the outcome is uncertain. That it is generally agreed throughout Great Britain, also, that marine engineering is on the brink of great development in the matter of boilers, there can be no doubt from the comment in engineering publications. The Marine Engineer of London discussing this subject editorially says: "Compound engines, which were once the engines par excellence for the economical conversion of steam into work, are now practically beaten out of sight by triple expansion engines working under 160 pounds of steam, as compared with half the pressure on compound engines. Where is this to stop? We are possibly within practical reach of 200 pounds per square inch, or over, utilized by quadruple expansion engines. And to produce this increase of steam pressure with safety and economy, the water tube boilers are giving a higher bid for chief popularity. They have this prima facie point in their favor, that safety under extremely high pressures can only be obtained by water chambers of very small diameter. The lowness of freights, and the demand for high speeds have both served to stimulate invention to the production of a higher initial steam pressure, with economy of fuel. Designs that would have been pushed aside by shipowners in the palmier days of freights, as too chimerical and risky to be entertained, are now considered in sober seriousness, in the hope that some form of change in the conditions of steam generation will help to pull the greatly depressed shipping profits out of the slough of despond into which they seem lately to have been sinking. But there is still much that may be done with the Scotch cylindrical boiler to fit it better to meet the greater demands of the day for increased and economical evaporation at a high pressure. Forced, or rather induced draught, seems to be mostly relied upon by those who support the merits of the Scotch boiler to give a much greater efficiency and evaporation per weight of material and per cubic capacity than heretofore. And there seems some reason to believe that we have not seen yet the ultimate developments of an induced draught, and maximum combustion per area of furnace in Scotch, or ordinary boilers. The great difficulty has hitherto been the burning or leaking of the boiler under high conditions of combustion per area of grate, and the rapid destruction of the bars under such conditions. Both these drawbacks, however, seem to be disappearing before the persistent enquiry and experiments of engineers, and it is now claimed that a high induced draught may be used without injury to the boilers, and that a hitherto unheard of combustion of fuel per area of grate may be effected without destruction of the fire bars. Thus the warfare between the new suggested form of tubulous boilers and the old reliable favorites is not yet concluded, and it is difficult yet to see even in which direction success will eventually lean. The tubulous boilers, even if successful in evaporation, have still to stand the severe test of durability under ordinary sea-going conditions, and on this point the cylindrical Scotch boilers have already a splendid record of nearly a generation to show. So they will take a lot of beating, and we can but congratulate ourselves and the ship owners that we shall be the wiser, and, we will hope, the better, by the chivalrous rivalry of the boilers."

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stock of wheat and corn in store at the principal points of accumulation on the lakes on Sept. 15, 1894:

	Wheat, bu.	Corn, bu.
Chicago.....	26,146,000	1,803,000
Duluth.....	2,391,000
Milwaukee.....	510,000
Detroit.....	1,654,000	3,000
Toledo.....	3,109,000	21,000
Buffalo.....	1,746,000	299,000
Total.....	35,556,000	2,126,000

At the points named there is a net decrease for the week of 56,000 bushels of wheat, and a net increase of 423,000 bushels of corn.

Illustrated Patent Record.

SELECTED ABSTRACTS OF SPECIFICATIONS OF A MARINE NATURE—FROM LATEST PATENT OFFICE REPORTS.

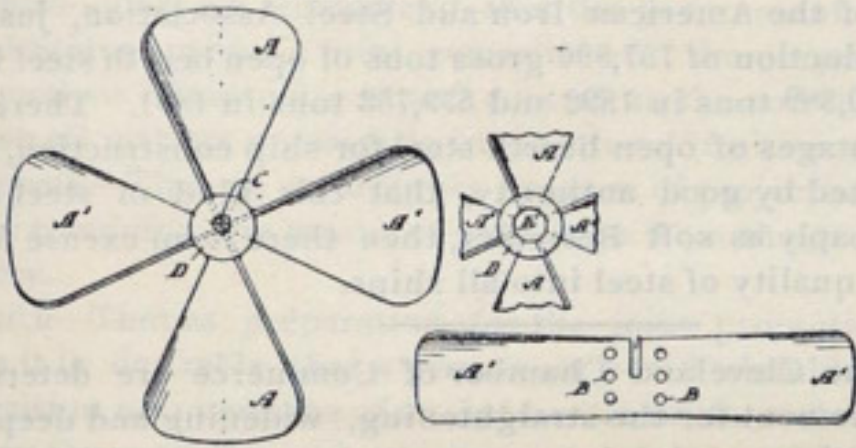
525,664. SCREW PROPELLER. John D. Muller, New York, N. Y. Filed Dec. 1, 1893. Serial No. 492,495.

Claim. A screw-propeller, consisting of rolled metal blades provided with cuts extending from edges of the blades toward their median lines and with perforations extending transversely in proximity to the cuts, and a hub cast in a single piece to the blades and through said perforations.

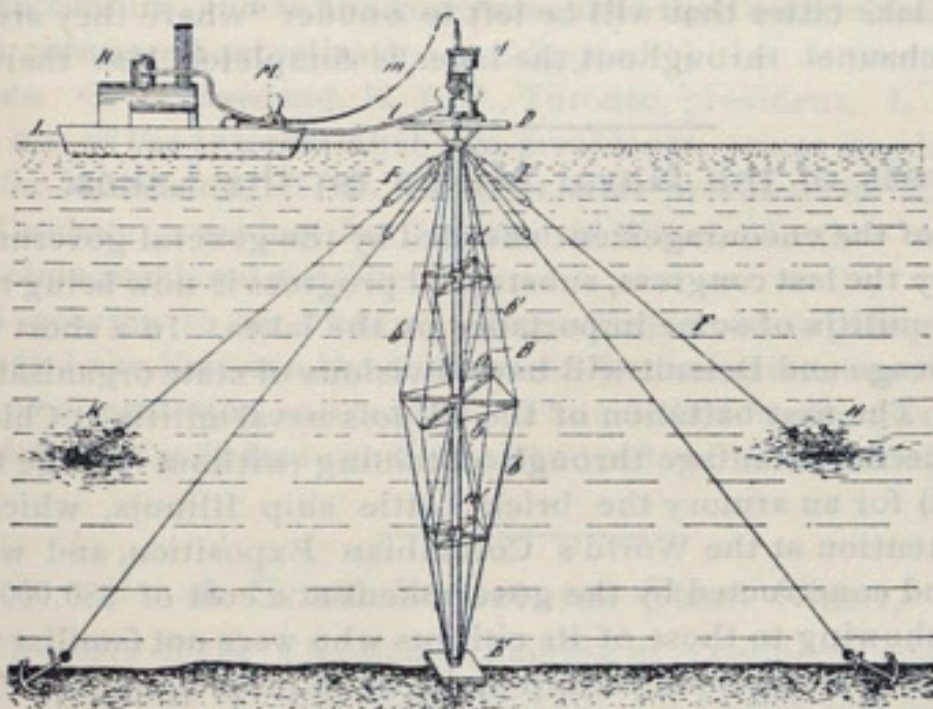
525,795. MEANS FOR MAKING BORINGS AT BOTTOM OF DEEP WATERS AND IN TIDE WAYS. Alfred W. Palmer, New York, N. Y., assignor to Chas. H. Tompkins, same place. Filed July 8, 1893. Serial No. 479,909.

Claim. First, the combination with a tubular post or column, provided with a platform at its upper end, a flange or plate at its lower end, and a set of trusses for preventing it from lateral flexure, of a rock drilling machine mounted upon said platform, with its drill or cutting portion extending down through the center of said post or column and series of guys for maintaining such post or column in an upright position. Second, the combination with a post or column composed of an exterior tube B', provided with a platform D, and a flange or plate E, and an interior tube B², and trusses for said exterior tube whereby to prevent it from lateral flexure, of means for maintaining said post or column in a vertical position, and a rock drilling machine mounted upon said platform with its boring rod extending through and working in the tube B².

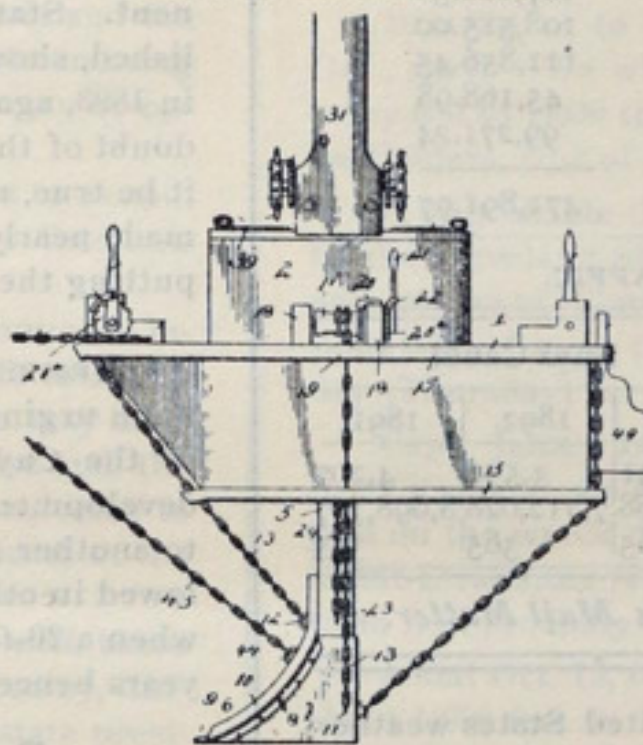
525,664. SCREW-PROPELLER.



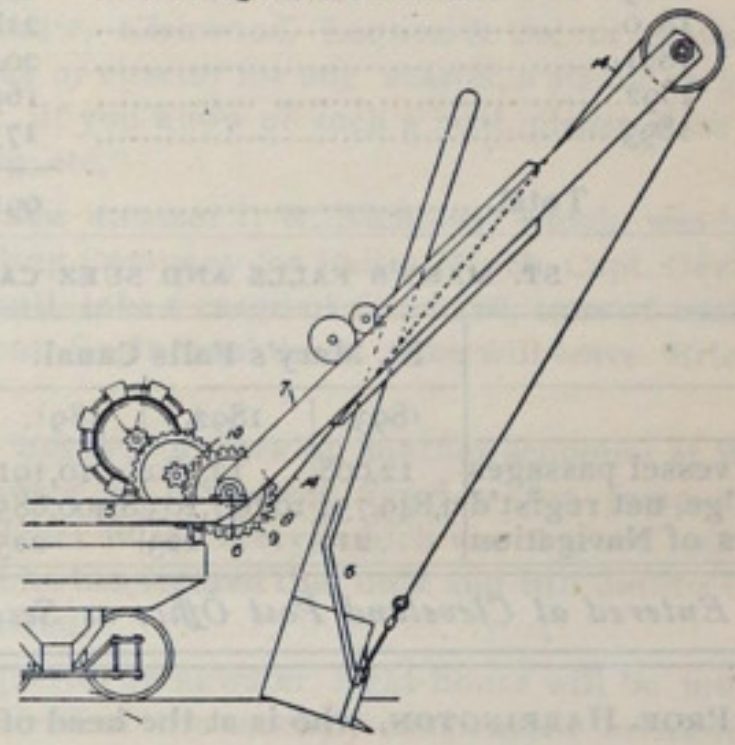
525,795. MEANS FOR MAKING BORINGS



525,897. SUBMARINE PLOW.



526,005. DREDGE.



525,897. SUBMARINE PLOW. John Halton, Round Rock, Tex. Filed Apr. 30, 1894. Serial No. 509,563.

Claim. A submarine plow consisting of a float, an approximately vertical well in the float and extending entirely through the same, a plow beam arranged and movable vertically in the well, two auxiliary wells arranged alongside the first well, a chain extending through the auxiliary wells and connected to the lower portion of the plow-beam, winding-drums on the deck of the float, over which drums the upper ends of the chains are connected, and two additional chains or ropes connected to the upper end of the beam and extending downwardly therefrom, whereby the beam may be adjusted in the well and held incapable of longitudinal movement.

525,881. HYDRAULIC METHOD OF PROPELLING VESSELS. Jacob Widmer, New Hartford, Conn. Filed Sept. 28, 1892. Serial No. 447,200.

Claim. In a mechanism for propelling vessels, in combination with a steam engine and a force pump, a discharge tube connected to said pump and opening through the walls of the vessel, a turbine wheel arranged within the tube and having external screw propeller blades secured to the moving part of the turbine and projecting beyond the surface of the tube.

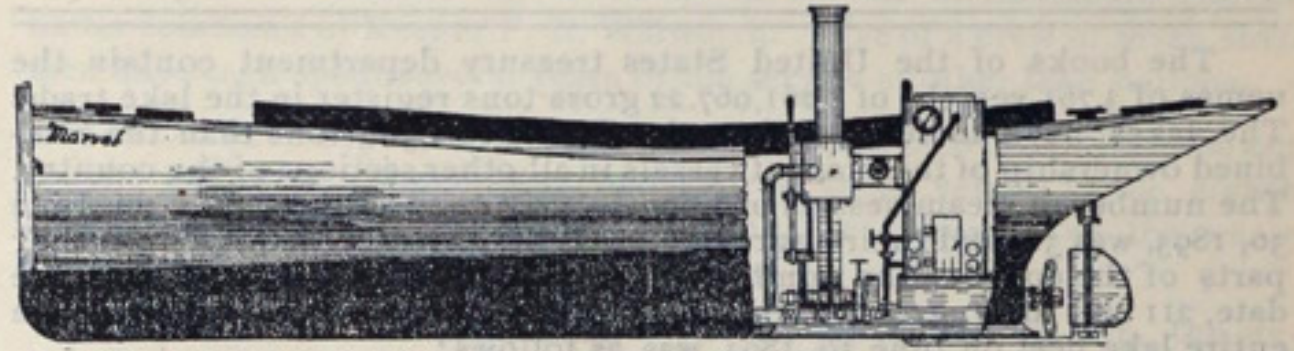
526,005. DREDGE. Erastus S. Bennett, Denver, Colo. Filed June 30, 1894. Serial No. 516,213.

Claim. First, in a dredge, the combination with the boom, the bucket, and the rope or cable attached to the bucket, of the winding drum

located on the hinge pin or shaft of the boom. Second, the combination with the boom and its hinge pin or shaft, of the winding drum located on said hinge pin or shaft, and carrying a gear whereby the drum may be rotated by suitable connections.

Vapor of Ether Instead of Steam.

Ether as a motive power for small vessels has been applied to a launch by Willard I. Twombly of Portland, Me. A picture of the boat thus pro-

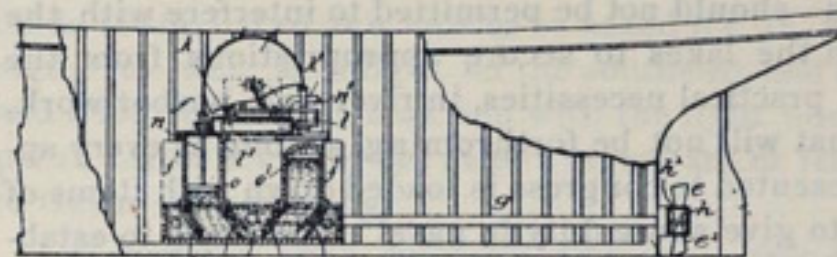


BOAT PROPELLED BY ETHER GAS.

pelled appears herewith. It is 16 feet long, 4½ feet beam, 24 inches deep amidships and draws 16 inches at the stern. Reduction of weight is the advantage claimed by the inventor in the use of ether. His boat weighs only 400 pounds, while a naphtha launch of the same size hull and same horse power (3) would, he claims, weigh 800 pounds. His description of the boat follows:

"The upright cylinder nearest the stern corresponds to the boiler of

525,881. HYDRAULIC METHOD OF PROPELLING VESSELS.



a steam engine. Inside the brass jacket is a coil of pipe. The ether enters at the top, being pumped from a tank in the bow, and as it passes down the coil, heated by burning naphtha, supplied by force of gravity from another tank in the bow, it is converted into vapor and as such passes up a straight pipe, through the middle of the coil, and over into the engine. From there it passes down through a pipe under the boat along the keel and up into the tank again by virtue of suction induced by the same pump that forces it into the coil. The cold water condenses the vapor into liquid ether, while in the pipe along the keel. Ether is vaporized at only 96 degrees of heat, while water requires 212 degrees. It condenses almost as easily as it vaporizes and would condense in the engine after coming from the boiler, but for the method devised for heating the engine. There is a connecting cylinder, shown in the illustration, between the boiler and engine. The heat of the naphtha passes through this and not only prevents the condensing of the ether vapor, but superheats it and of course adds to its power, for vapor of ether when superheated expands to five times its bulk."

Members of the Michigan legislature talk of taxing mine royalties. It is not probable that such a movement would meet with opposition from the producing interests.

A dividend of \$1 a share was paid this week to stockholders of the Lake Superior Iron Company. Notes of this kind are rare of late.

MARINE REVIEW.

DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 516 Perry-Payne building, Cleveland, O.

SUBSCRIPTION—\$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

The books of the United States treasury department contain the names of 3,761 vessels, of 1,261,067.22 gross tons register in the lake trade. The lakes have more steam vessels of 1,000 to 2,500 tons than the combined ownership of this class of vessels in all other sections of the country. The number of steam vessels of 1,000 to 2,500 tons on the lakes on June 30, 1893, was 318 and their aggregate gross tonnage 525,778.57; in all other parts of the country the number of this class of vessels was, on the same date, 211 and their gross tonnage 314,016.65. The classification of the entire lake fleet on June 30, 1893, was as follows:

Class.	Number.	Gross Tonnage.
Steam vessels.....	1,731	828,702.29
Sailing vessels.....	1,205	317,789.37
Canal boats.....	743	76,843.57
Barges.....	82	37,731.99
Total.....	3,761	1,261,067.22

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

	Number.	Net Tonnage.
1889.....	225	107,080.30
1890.....	218	108,515.00
1891.....	204	111,856.45
1892.....	169	45,168.98
1893.....	175	99,271.24
Total.....	991	471,891.97

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.

	St. Mary's Falls Canal.			Suez Canal		
	1893.	1892.	1891.	1893.	1892.	1891.
No. vessel passages	12,008	12,580	10,191	3,341	3,559	4,207
Ton'ge, net regist'd	9,849,754	10,647,203	8,400,685	7,659,068	7,712,028	8,698,777
Days of Navigation	219	223	225	365	365	365

Entered at Cleveland Post Office as Second-class Mail Matter.

PROF. HARRINGTON, who is at the head of the United States weather bureau, is a man of high scientific attainments, and is undoubtedly well fitted for the position he holds. The same may be said, also, in a general way, about his assistants, if their service elsewhere is appreciated as it is on the lakes, and there is every reason to believe that it is. But Prof. Harrington's zeal for the pursuance of scientific knowledge—the working out of far-fetched theories—should not be permitted to interfere with the efforts of vessel owners on the lakes to secure appropriations from the government for absolute, practical necessities, in river and harbor work, aids to navigation, etc., that will not be forthcoming as long as every appropriation bill that is presented to congress is loaded down with items of expense intended mainly to give shore duty to naval officers and to establish and maintain positions for new men in various branches of the government service that pertain to shipping. Prof. Harrington recently returned from a summer trip along the north shore of Lake Superior. He was there, he said, to still further study the subject of lake currents. Lengthy interviews with him, attaching the highest importance to the study of currents on the lakes, have appeared in various newspapers, mainly in the east, away from the lakes, and in all of them the only excuse given for the fuss that has been made about bottle experiments, etc., is contained in the few sentences here quoted: "While the weather bureau was engaged in the preparation of a wreck chart, two years ago, for the great lakes, it was noted that the floating timbers had a tendency to cluster on certain parts of the surface, suggesting the existence of unknown currents, which might play a considerable part in wrecking. It was due to this observation that the experiments in current-location originated. It was thought by the officials of the agricultural department at that time, that government money could not be more judiciously appropriated than to carry on these observations, which might locate in the lakes the probable paths to be taken by wrecked vessels. Furthermore, cases in the courts of admiralty were continually referring to the drifts in the great lakes, while in the criminal courts of the towns and cities along shore the question was ever arising as to where certain bodies found by sailors had drifted from, or as to what might be their destinations." Now, to a man possessing Prof. Harrington's scientific turn of mind, the drift of a wreck may be of interest, but the practical business sense of a vessel owner, who might be unfortunate enough to have a captain and crew return to him with no knowledge of where their vessel had gone to, would prompt him to send a tug after her at once, and he would have no difficulty in finding, even

among tug captains, men who know almost every nook and corner on the lakes as well as they do the streets of the town in which they were born. The wreck chart referred to has been found of some use as an outline map of the lakes, suited to be hung up in an office, and there is little need of noting that the advanced practice of admiralty courts in these days is not dependent upon theory regarding currents. But it was not the intention to go into special criticism here of this new work on the part of the weather bureau. It is the general tendency on the part of government bureaus to crowd out necessary appropriations with their own special aims that is complained of, and which should not be encouraged.

IN VIEW of the great reduction in the price of iron ore and other changes that have come over the iron business since John D. Rockefeller became identified with the development of the Mesabi range of Minnesota, through the organization of the Lake Superior Consolidated Mines, it is probable that Mr. Rockefeller and his associates would willingly wash their hands of everything pertaining to the term Mesabi and all that it covers in soft ore, if they could get their money out of a transaction that has prospective value, but is a heavy load to carry. But the men who were relieved of immediate downfall, seem determined to make it uncomfortable for the head of the great Standard company. Dispatches from Duluth announce that leading stockholders in another of the companies that were taken into the consolidation—the Lonejack Iron Company—have begun suit, claiming that they were treated unfairly.

OF THE few branches in the steel industry which showed an increase during the year 1893 over 1892 that of open hearth steel is most prominent. Statistics of the American Iron and Steel Association, just published, show a production of 737,890 gross tons of open hearth steel ingots in 1893, against 669,889 tons in 1892 and 579,753 tons in 1891. There is no doubt of the advantages of open hearth steel for ship construction, and if it be true, as asserted by good authority, that this kind of steel can be made nearly as cheaply as soft Bessemer, then there is no excuse for not putting the better quality of steel into all ships.

MEMBERS of the Cleveland Chamber of Commerce are determined upon urging a movement for the straightening, widening and deepening of the Cuyahoga river at local expense, rather than waiting for the development of visionary plans for an outer harbor that should be left to another generation. The policy is a wise one and might well be followed in other lake cities that will be left to wonder "where they are at," when a 20-foot channel throughout the lakes is completed, less than two years hence.

Progress of the Naval Militia on the Lakes.

As a result of the encouragement afforded by the general government in acts passed by the last congress, substantial progress is now being made towards a naval militia of some importance on the lakes. In a short time the cities of Chicago and Detroit will have divisions of state organizations well equipped. The first battalion of the Illinois naval militia at Chicago has secured a special advantage through obtaining (without charge from the government) for an armory the brick battle ship Illinois, which attracted great attention at the World's Columbian Exposition, and which was designed and constructed by the government at a cost of \$80,000, for the purpose of showing to those of its citizens who were not familiar with naval matters how a modern battle ship looks when fully equipped. This prize was secured for the Chicago branch of the Illinois naval organization by the efforts of Senator Cullom and Congressman Aldrich, and it will undoubtedly make one of the finest naval militia armories in the country, inasmuch as it contains most of the features of a real vessel and gives to the recruit advantages he would never have at a shore armory. By the gift of the government, the Chicago organization has also received twelve boats, including a steam launch, sailing launch, cutters, etc., and all their equipments, one one-pounder rapid fire Hotchkiss cannon, cutlasses, etc. Preparations are now being made to move the Illinois nearer the center of the city. The design is to float it by means of pontoons, and the work is to be paid for by a popular subscription.

Although progress with the Detroit division, the first of the Michigan State Naval Brigade, has not been so rapid as that noted from Chicago, a substantial organization has been effected in the City of the Straits, and its officers were informed a few days ago by the secretary of the navy that a loan of equipment will be forthcoming as soon as the governor of the state makes written application for the same. The equipment will include three men-of-war cutters, a 3-inch breech-loading rifle, and one 50-caliber gatling gun with field carriages and equipments, and forty cutlasses, belts and frogs. The navy department is also understood to be favorably disposed towards plans of the officers of the Detroit organization for a cruise on the U. S. S. Michigan, when that ship is finished with survey work at the mouth of the Detroit river.

The law under which these loans of equipment are made by the navy department was passed on Aug. 3 last. A regularly organized naval militia in any state may obtain the same assistance.

Toronto Waterways Convention.

Although the international waterways convention, which was held in Toronto this week, was not as well attended by representatives of commercial bodies in cities of the United States as were the conventions held, some time ago, at Sault Ste. Marie and Detroit, Mich., the effort of the citizens of Toronto may well be pronounced a success, inasmuch as it will tend to still further direct attention to the demands of the people of the northwest, both in Canada and the United States, for a deep water connection between the lakes and the Atlantic seaboard. Of course, an effort was made to commit delegates from the United States to seek support from their government for the Canadian—St. Lawrence route, as against a route through American territory, but a compromise was effected in the following resolutions, which recommended co-operation on the part of both governments:

Whereas, This convention is assembled for the purpose of promoting the union of the lakes and the high seas by waterways of the greatest practical capacity and usefulness, and recognizing the supreme utility of such a waterway development; therefore,

Resolved, first—That the depth of all channels through the lakes and their seaboard connections be not less than 21 feet, and that all permanent structures be designed on a basis of not less than 26 feet, so to be obtained as may be demanded by the future necessities of commerce.

Second—That this convention recognizes the utility of the natural route to the sea by the St. Lawrence river and is also impressed with the commercial necessity of the route reaching the American seaboard by the Hudson river.

Third—That we recommend that the government of Canada and the United States appoint a joint committee for the purpose of determining the questions of mutual cost and control, to the end that they may co-operate on all matters necessarily international in character.

Fourth—That we accordingly approve of projects designed to extend marine commerce by means of waterways from the great lakes into new territory.

Fifth—That as preparation for the joint promotion of common interests it is desirable that a permanent board should be constituted for the decision of questions of an international character, which may arise between the peoples and governments of the British Empire and the United States, and that this resolution be respectfully communicated to the governments and parliament of Great Britain and the colonies of the British Empire, and to the government of the United States.

A permanent organization was formed by the convention with these officers: O. A. Howland, M. P. P., Toronto, president; L. E. Cooley, Chicago, one of the international vice-presidents; James Suydam, state president for Minnesota; H. W. Seymour, state president for Michigan; Capt. J. S. Dunham, president for the state of Illinois; Luther Allen of Cleveland, state president for Ohio.

A scheme to so obstruct Niagara river as to give greater depth of water in Lake Erie and the shallows in Detroit river, was submitted in the form of a resolution and carried. The resolution also favored the speedy completion of a 36-foot canal on either side of the boundary line at the Sault.

A Great Structural Steel Plant.

Directors of the Cleveland Chamber of Commerce visited the works of the Cleveland Rolling Mill Company on Friday last and were shown through nearly the entire plant, by the courtesy of Messrs. Wilson B. Chisholm, Ed. S. Page, John H. Early, L. T. Power and Alva S. Chisholm, all of whom are connected with the company. Extended reference to this company, which is known as one of the oldest in the iron business in this country, or to its immense plant, which includes one of the largest wire mills in the world, is unnecessary, but it should be a matter of considerable pride to the people of Cleveland to know that improvements costing a full million of dollars, and represented mainly in a new steel works, have been made within a couple of years on a policy involving practically no indebtedness and thus insuring greater stability in a big institution that has always been noted for its sound financial standing. An inspection of the new steel works was the object of the visit of the directors of the commercial body. It is well known among people in the iron business that this new works has placed the Cleveland company in a position to compete with the largest firms in the country on structural material, and plans now about completed for doing away with cupolas and transferring hot metal direct from blast furnaces to the converters will still further increase the efficiency of the plant. Although the company's central furnaces in Cleveland are located about five miles from the steel works, the hot metal will be carried in ladles on cars specially constructed for the service and after passing into a "mixer" will be transferred to the converters.

Take No. 6.—For Buffalo, New York and Boston, it is the fast train east on the Nickel Plate road and carries through palace buffet sleeping cars.

156-8

Miscellaneous Mention.

Capt. Philip O'Connor, the owner of several pleasure steamers, died at Milwaukee, Monday, aged forty-seven years.

In ten hours, Sunday, 3,036 tons of coal was put aboard the steel steamer Kearsarge at Ashtabula with the McMyler car dumping machine. This is the best work as yet done with the big machine.

A capable crew of life savers are now in service at Ashtabula Harbor under command of Keeper F. E. Walworth. Five of a crew of seven surfmen have each spent several years in the service at other lake stations.

As had been expected, the president has again nominated J. H. Galwey for the position of supervising inspector of steam vessels in the eighth district, Detroit, and he will now take charge as a result of the senate recess.

The passenger steamer North West is now on her last trip, the sixteenth for the season between Buffalo and Duluth. She has traveled 35,000 miles and is said to have carried 8,300 people, with less than fifty passes.

Prosper Martel, a lake engineer who was employed on the steamer John Pridgeon, Jr, when she was regarded as one of the best boats on the lakes, and who was also on the government steamer Michigan, died at Merrill, Mich., Monday.

Officers of the Cedar Point Pleasure Resort Company of Sandusky are trying to sell the small excursion steamer R. B. Hayes, and if they succeed in doing so they will contract for the construction this winter of a steel hull excursion boat.

In a letter to the REVIEW, Kirkwood, Lennon & Co. of Sudbury, Ont., say: "We wish to buy or charter for one season, a steam barge to carry 600 to 1,000 tons coal. If you know of such a boat, please state full particulars, cost of operating, etc."

It is probable that the new steamer I. W. Nicholas, which was built by the Cleveland Ship Building Company for Philip Minch, Capt. Gerlach and others of Cleveland, will take a cargo of full 3,200 tons of coal to Lake Superior on the present Sault canal draft. She will leave Erie today (Thursday) for Duluth.

Capt. James Davidson has begun work on another schooner at West Bay City, and as he is known to have been figuring for some time past on the wreck of the steamer W. A. Avery, which was burned last fall in the Straits, the report that he has secured that hulk and will build a boat from it is probably well founded.

About Oct. 15, the Marquette breakwater light-house will be moved about 1,000 feet to the outer end of the recently constructed breakwater extension. During the time of removal the light in the tower will be extinguished, and in its place a fixed red lantern light will be exhibited from a post at the outer or south end of the breakwater.

At the request of officers of Lake Michigan passenger steamers, it is probable that the Lake Carriers' committee on aids to navigation will include in the list of new aids to be asked for in the next congress a fog signal as well as a light on the southeast end of North Manitou island, and a fog signal in connection with the light now in operation at Harbor point, Little Traverse bay; also a signal at Cat Head light-house, entrance to Grand Traverse bay.

A dispatch sent out from Chicago a few days ago, stating that the steamer Curry was forced to burn her hatch coverings in bringing a big cargo of ore from Lake Superior, was probably inspired by someone who was hurt by the Curry's achievements in the cargo line of late. The intent was plain in the report itself, as the Curry has several times carried larger loads from Lake Superior than the one referred to, and but for the decrease in draft at present at the Sault canal, could bring down several hundred tons more than the amount credited to her.

The new torpedo boat Le Chevalier, 118 tons, constructed by M. Normand of Havre, the famous French builder of high speed vessels, has its rudder in front of the propeller, so as to avoid the necessity of extending the keel as a support for the rudder frame. The screws are placed in two transversal planes, and turn in the same direction. The machinery is composed of two triple expansion engines, each working a propeller and they are supplied by two boilers upon the Du Temple system. M. Normand has profited by his own experiments, and the experiences of Messrs. Yarrow of England in suppression of vibration, and this is done partly by equalizing the weight of the pistons. At the trials the engines developed 2,800 horse power without forced draught, and the consumption of coal did not exceed 900 grammes per horse power per hour. Under these conditions the speed attained was 27.22 knots. It was thought that this boat would attain a speed of 30 knots, but it is still in an experimental stage, and M. Normand himself does not seem to be very sanguine as to its ultimate success.

Four steel engravings of U. S. war ships and a color plate of the steel steamer Gratwick will be forwarded by MARINE REVIEW, 516 Perry-Payne Bldg., Cleveland, O., to any address on receipt of \$1.

Another Big Hopper Dredger.

Another big hopper dredger, built by Wm. Simons & Co. of Renfrew, Scotland, is described in English exchanges. The vessel, which is for the European Danube Commission, is built of steel to Lloyd's requirements, and has a capacity in its hoppers for 1,300 tons of debris. Its dimensions are: Length, 227 feet; breadth, 40 feet; depth, 17 feet. At trials the buckets filled the hopper with clay and mud at the rate of 1,000 tons per hour. They can dredge to a depth of 35 feet below the water line. In addition to the buckets a powerful centrifugal sand pump, driven by a separate set of triple expansion engines, is provided. It is capable of lifting 1,000 tons of sand per hour from the same depth. Two sets of triple cylinder expansion engines are provided for driving the twin propellers; they also work the dredging machinery, either pair being capable of doing so. Steam is supplied by two mild steel boilers constructed to Lloyd's rules for a working pressure of 160 pounds per square inch. At Skelmorlie, where the speed trials took place, a mean speed of $10\frac{1}{4}$ knots was obtained when fully loaded.

Around the Lakes.

Duncan Robertson, ship builder of Grand Haven, Mich., will build a tug 64 feet long, 14 feet beam and $6\frac{1}{2}$ feet hold, with a 12 x 12 engine and a marine boiler.

Cleveland's new fire boat hull, building at the ship yard of the Union Dry Dock Company, Buffalo, will be launched about the 27th inst., and it is expected that it will be delivered in Cleveland before Oct. 1.

It is again announced that the harbor towing war in Chicago is at an end. There is considerable ill-feeling existing between the tug companies, however, and harmony is not expected to linger with them.

Commander Dayton, U. S. N., inspector of the ninth light-house district, gives notice that the fog signals at Beaver island light station, Mich., are disabled, and not in operation. Repairs will be made as early as possible.

The excavation for the dry dock for the Craig Ship Building Company at Toledo is being rapidly pushed. When this dock is completed all of the important ports on the lakes will be well provided for in this regard. The Toledo dock will be large enough to admit vessels of 400 feet length, and the surface will be 100 feet wide. The pumping machinery will be adequate for the rapid handling of the water, and the ship building plant will care for all repair work.

Crawley & Johnston, Cincinnati, O., have been fitting several lake steamers with automatic steam steering gear. They have not said a great deal about it, but the master of the John B. Lyon says the gear fitted on his boat is a perfect success. "Chaplain" Jamieson says that he is still very much pleased with the gear fitted on the Geo. H. Dyer, and Fitzgerald & Co., Milwaukee, added to a letter, enclosing a draft, that the captain of the Omaha reported the steerer working well.

J. J. Lynn's plan of sending homing pigeons out with tugs called from Port Huron to do wrecking work seems to have some merit attached to it. The pigeons being away from their homes for only a few days at the most would return, and messages carried by them might be the means of a valuable saving in time, but birds carried for any great length of time on a ship would be of no use in an emergency, as they would have no home unless it was the ship on which they were carried.

Regarding the little chart of Hay lake channel issued by P. M. Church & Co. of Sault Ste. Marie, Mr. Church says: "This sketch is accurately drawn and it is in itself sufficient to enable any careful master to take his ship through the channel. In order to keep the size within the limits which are required, we were unable to show the depth of water, a fact which we regret, but it may be noted that from two miles above Neebish island to Six-Mile point, the deep water is not less than one mile in width."

A Detroit exchange says of the season's log rafting business: "The Parker & Millen tugs Balize, Capt. John E. Tobin, and Onaping, Capt. H. J. Hagan, have returned, after a season of four months' raft towing in Lake Huron for the Michigan Log Towing Company. Officers of the boats say this has been the greatest season for towing logs in the entire history of the business. The company with which they were engaged moved from 120,000,000 to 150,000,000 feet of logs, and other companies also had a large business. The Balize and Onaping will be stationed at Detroit for wrecking business during the fall months."

Another Chicago item referring to the smoke question follows: "More tests of the use of oil as a fuel on tugs in Chicago harbor are to be made at once under the supervision of Chief Smoke Inspector Adams, who has just returned from the east, where he made further investigation of the fuels in use in the eastern cities on tugs. He also saw the authorities of the treasury department at Washington and perfected arrangements whereby tug owners can secure the necessary permits to fit their boats with oil burners, upon application to the department, and he will insist that the tugs adopt oil as a fuel."

In General.

The Ammen ram, building at the Bath Iron Works, Bath, Me., is required by contract to make 17 knots per hour. For each quarter knot excess in speed the builders get \$10,000.

The power plant on the Canadian side of Niagara Falls has been begun by the Canadian Niagara Falls Power Company. It will be similar to that on the American side, and have three turbines, with provision for three more.

The William Cramp and Sons Ship and Engine Building Company of Philadelphia, at its meeting last week, declared a quarterly dividend of 2 per cent. and an extra dividend of 10 per cent. on the capital stock, payable Sept. 15.

A letter from Commander C. D. Sigsbee, hydrographer, U. S. N., announces the publication of a hydrographic chart of Korea, and parts of China and Japan, which contains the field of the present war between China and Japan. The price of the chart is 20 cents.

Safa-el-Bahr, meaning joy of the sea, is the name given to a steam yacht of 700 tons and 1,100 horse power, constructed by Messrs. A. & J. Inglis, British ship builders, for the Khedive of Egypt. The boat has all the latest accessories of a completely furnished yacht.

An immense dredging job is that of removing the bar at the entrance to the River Mercy. In twelve months just past about 4,500,000 tons of sand has been dredged, making a total of nearly 7,000,000 tons since the operations were begun. The great dredger which is employed can be used in rough weather. In twenty-four hours it took up 39,000 tons of sand, and in a week, or five and a half days, 183,000 tons.

There are over thirty-two classes of workmen—mostly skilled mechanics—directly employed in the construction of a steamship. When there is added to these those other trades dependent largely for support upon the work given by a vessel, it will be seen that the vessel and its business do more for the welfare of the country than almost any other article of manufacture. The building and running of ships are good things and should be encouraged.—Maritime Register, New York.

A power test of the engines of the new battleship Maine will occur on Long Island sound this week. The engines have been completed for over a year, but a test of them has awaited the fitting of the armor belt. This test will be to determine the power of the engines and boilers only and no attention is to be paid to speed. The contract calls for 9,000 horse power for four consecutive hours, and a premium of \$100 will be given for every horse power over that, with a corresponding penalty for all under that figure. If the power falls below 8,500 the machinery will probably be rejected.

A marine reporter on a Cleveland daily paper who once noted that a vessel clearing port was loaded with summer cottages found considerable difficulty in proving afterwards that he was not the victim of a joke, as the cottages, shipped by an enterprising firm of lumber dealers, were in sections, suited to loading aboard the vessel, but requiring little labor in putting them together. Now comes a note from the Pacific coast of a stranger cargo. A man in Seattle, who was about to remove to Olympia, sixty miles distant, concluded that he could not afford to build a new house, so he rolled one that he owned in Seattle down to the river, loaded it aboard a flat boat and had it towed to his new place of residence.

Having crossed the Atlantic in both directions in less time than any other ship, the Cunarder Campania has now fully established her position as "Queen of the Sea." Her last record-breaking voyage was concluded on Friday last when she arrived in Queenstown after having made the westward passage in identically the same time as that required on her best eastward voyage—5 days, 8 hours and 38 minutes; but on the westward trip she covered a distance of 23 miles more than she did on the record breaking trip last month. The Lucania's day runs on the present trip were 447, 512, 494, 514, 506 and 337, making a total of 2,810 knots; her average speed being 21.84 knots. She holds the highest average hourly speed record, 21.89 knots, made in June last, and her 560 knots covered in one day in October, 1893, is still the record for the longest day's run.

Remember the Nickel Plate road has a Home Seekers' excursion Sept. 25 and Oct. 9. 151-8

The steel freight steamer to be built by F. W. Wheeler & Co. of West Bay City, Mich., for Capt. John Mitchell and others will be classed in the Bureau Veritas.

Ask agents of the Nickel Plate road for Home Seekers' excursion rates on Sept. 25 and Oct. 9. 152-8

U. S. ENGINEER OFFICE, Burlington, Vt., September 5, 1894.—Sealed proposals in triplicate, for dredging in Great Chazy River, N. Y., will be received here until 2 p. m., October 5, 1894, and then publicly opened. Full information furnished on application to Smith S. Leach, Capt. Engineers. 27



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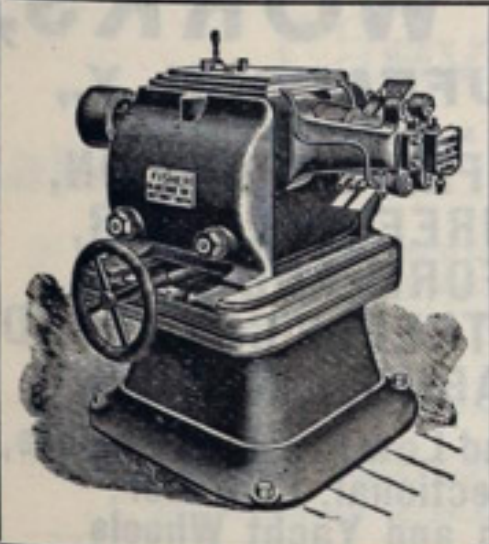
U. S. ENGINEERS OFFICE, 34 West Congress street, Detroit, Mich., September 12, 1894.—Sealed proposals for furnishing all labor, materials and appliances, and removing shoals of boulders, both bedded and loose, and other material, from vicinity of Ballard's Reef in Detroit river, will be received here until 2 p. m., standard time, October 12, 1894, and then publicly opened. All information furnished on application. O. M. POE, Col., Corps of Engrs. Oct 4

U. S. ENGINEER OFFICE, Burlington, Vt., September 5, 1894.—Sealed proposals in triplicate, for dredging in Ogdensburg Harbor, N. Y., will be received here until 2 p. m., October 5, 1894, and then publicly opened. Full information furnished on application to Smith S. Leach, Capt. Engineers. 27

U. S. ENGINEER OFFICE, Burlington, Vt., September 5, 1894.—Sealed proposals in triplicate, for rock excavation in Otter Creek, Vt., will be received here until 2 p. m., October 5, 1894, and then publicly opened. Full information furnished on application to Smith S. Leach, Capt. Engineers. 27



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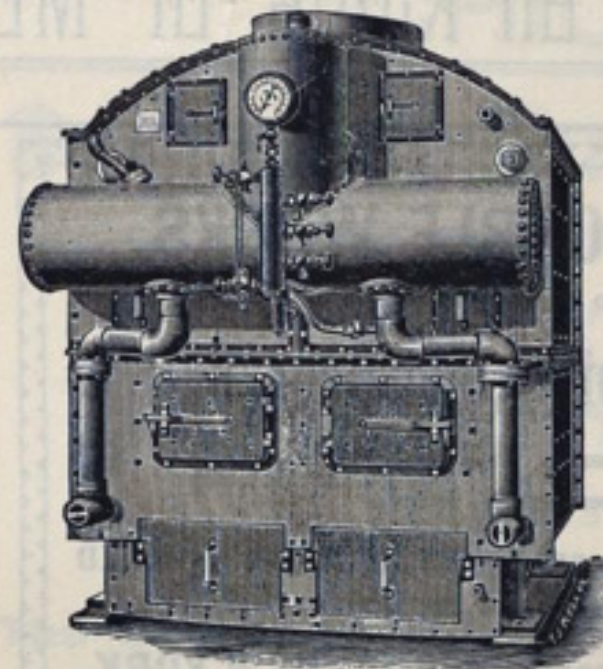
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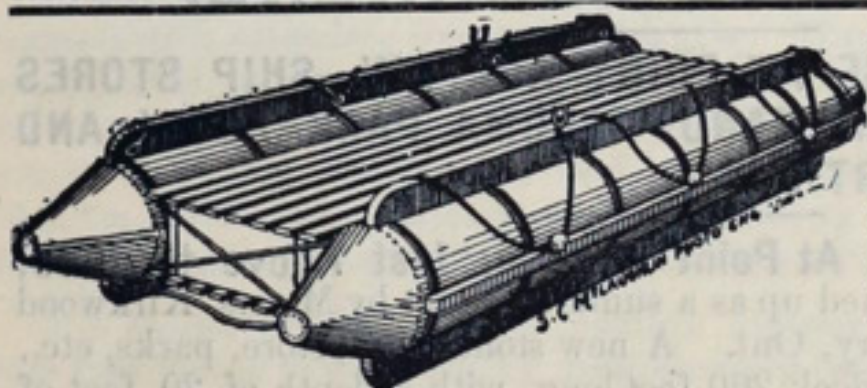
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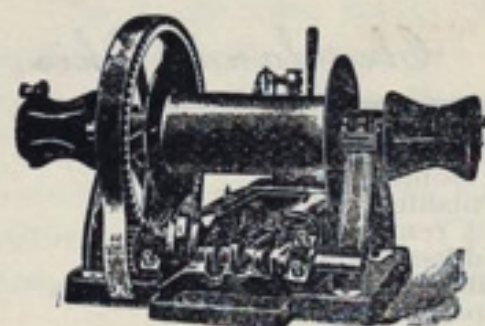
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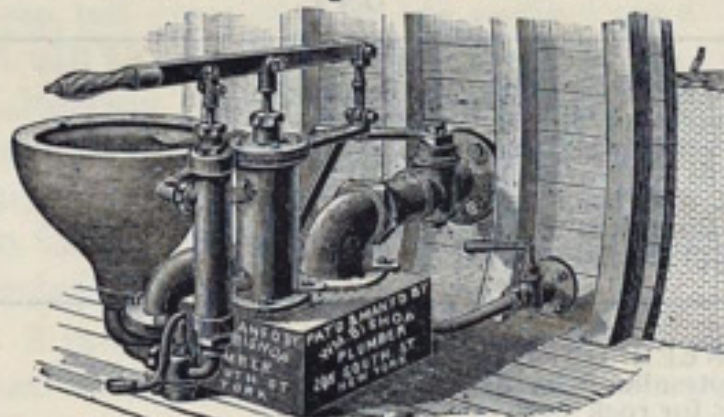
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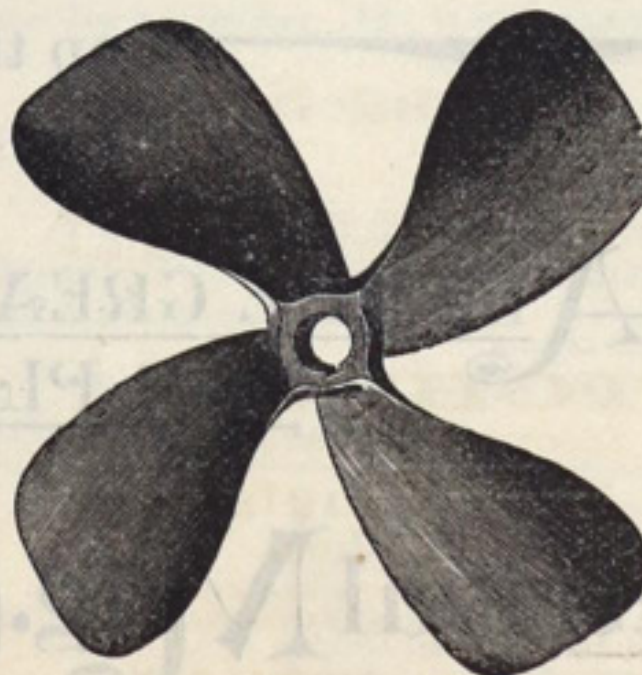
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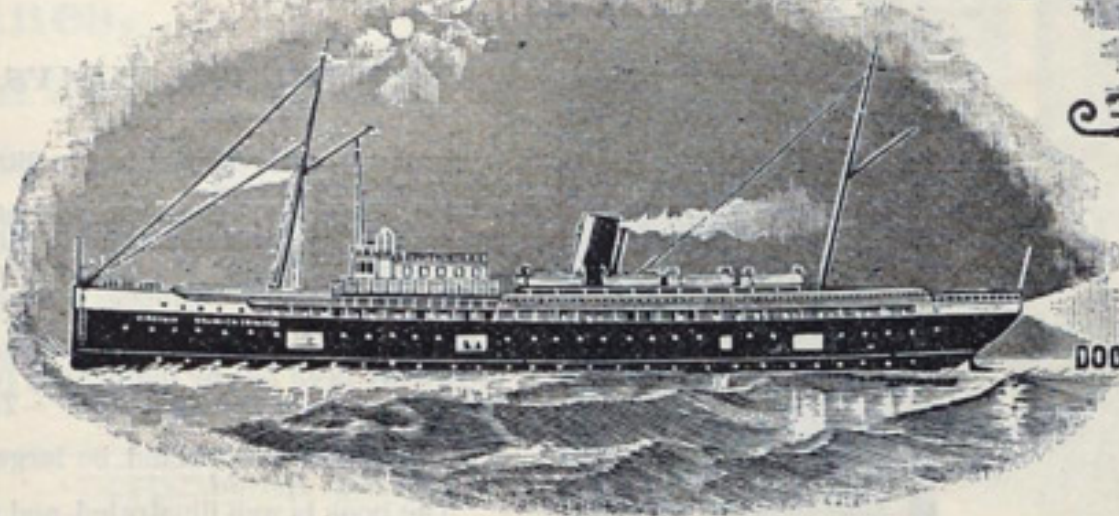
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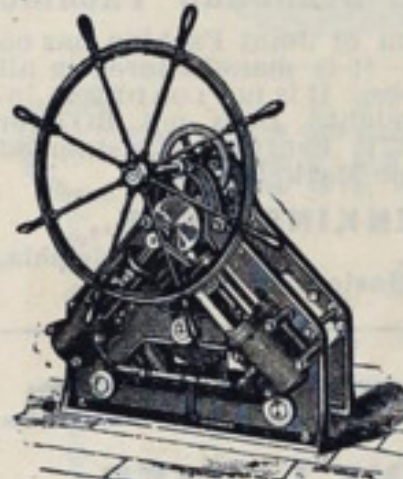
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References: American Steel Barge Co.;
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U. S. ENGINEER OFFICE, 34 West Congress
St., Detroit, Mich., August 23, 1894. Sealed
proposals for furnishing all labor, materials, and
appliances, and removing a shoal of bed rock and
other material from Sec. 8, Ship Channel between
Chicago, Duluth and Buffalo, will be received
here until 2 p. m., standard time, September 22,
1894, and then publicly opened. All information
furnished on application.
Sept. 14 O. M. POE.
Col. Corps of Engineers.

U. S. ENGINEER OFFICE, Burlington,
Vt., September 5, 1894.—Sealed pro-
posals in triplicate, for repairs to Burlington
Breakwater, Vt., will be received here until 2 p.
m., October 5, 1894, and then publicly opened.
Full information furnished on application to
Smith S. Leach, Capt. Engineers, 27

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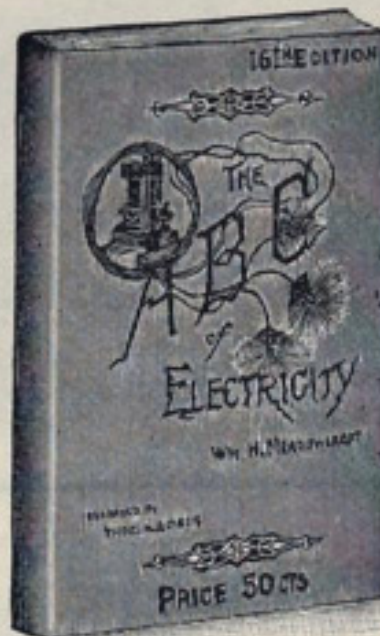
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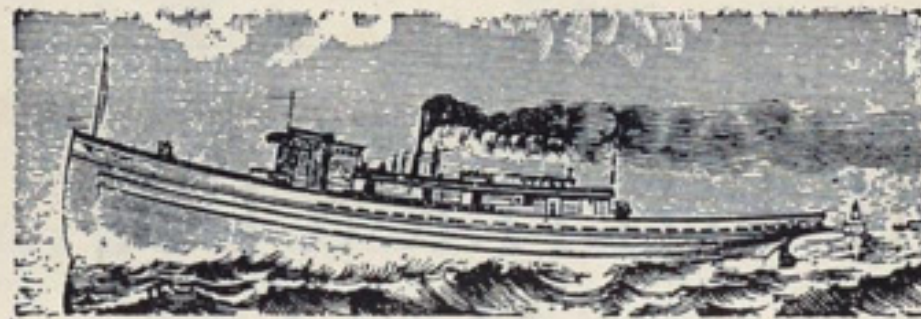
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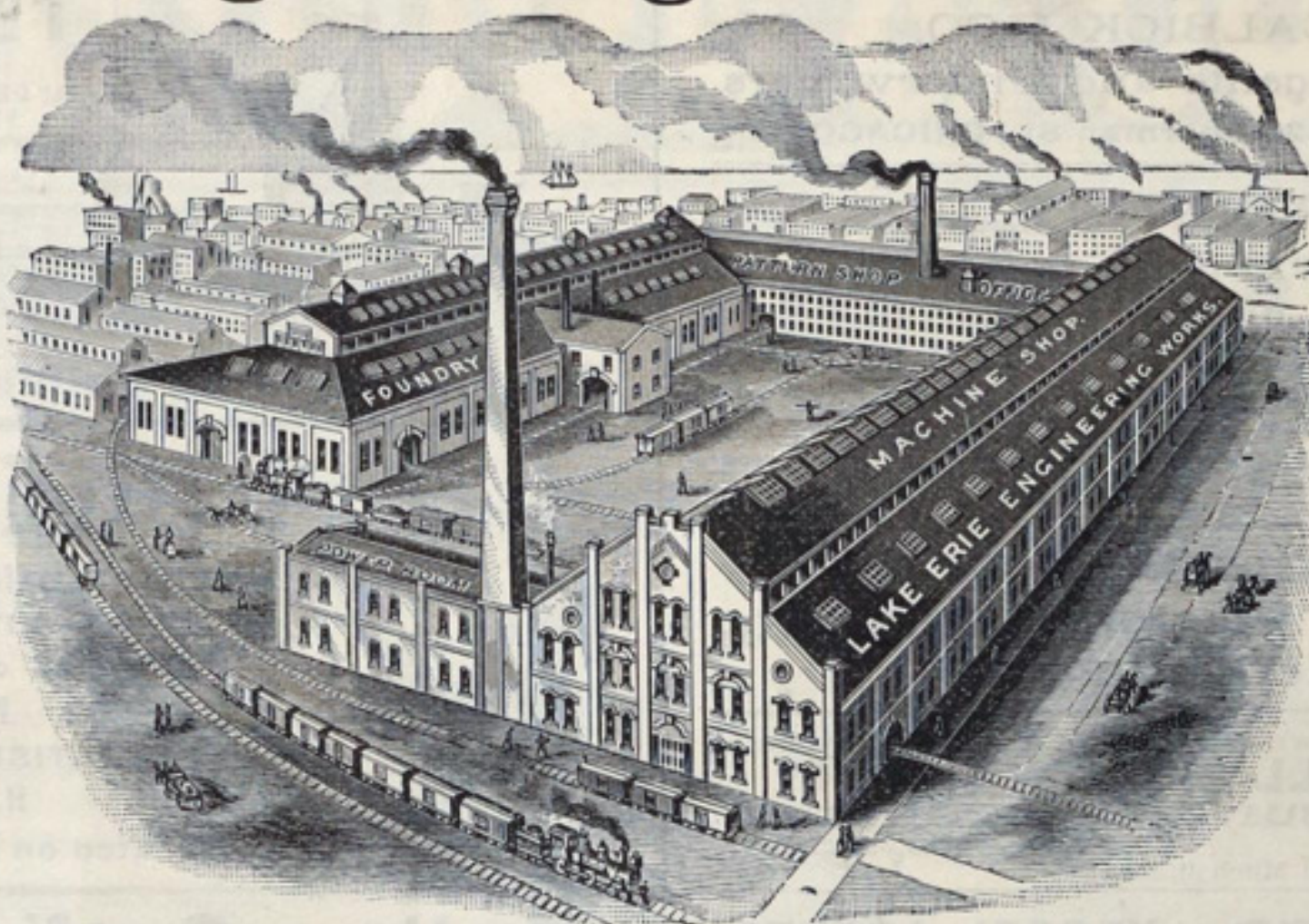
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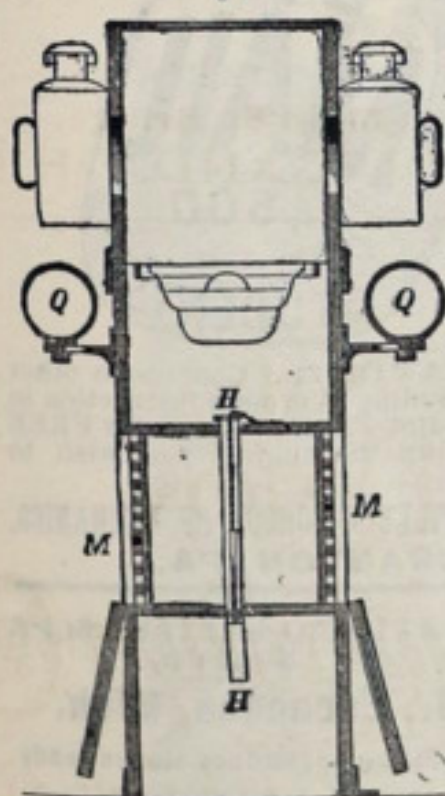
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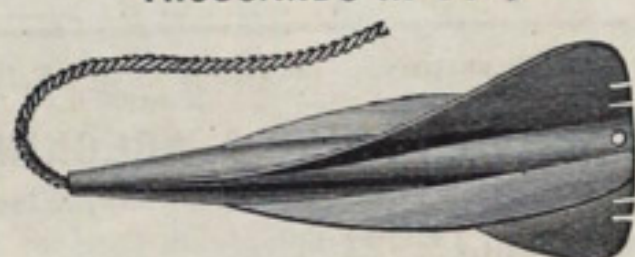
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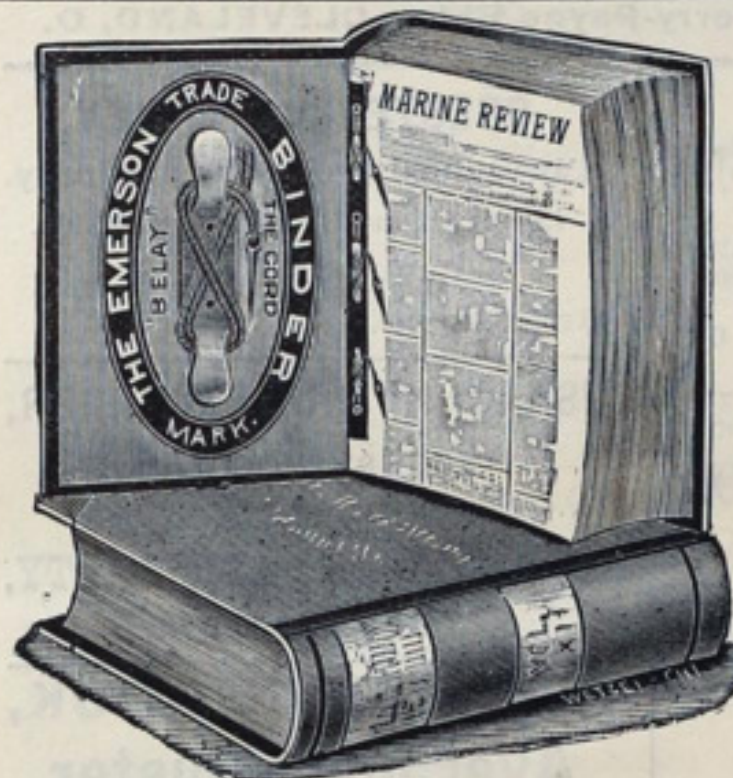
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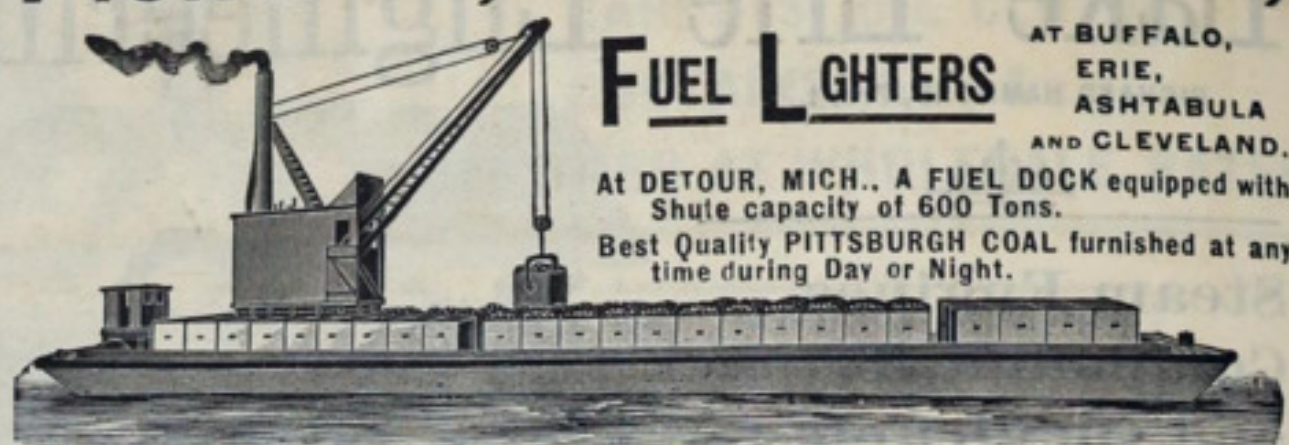
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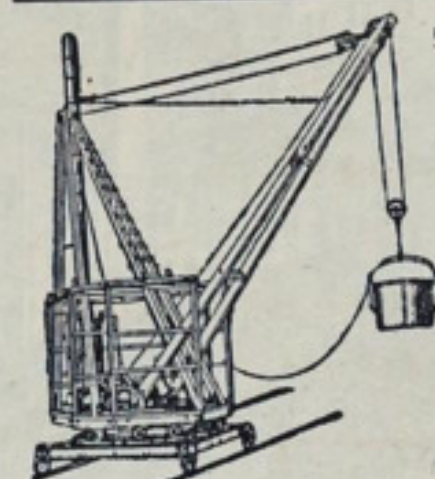


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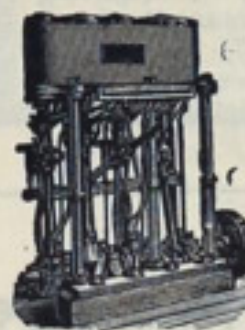
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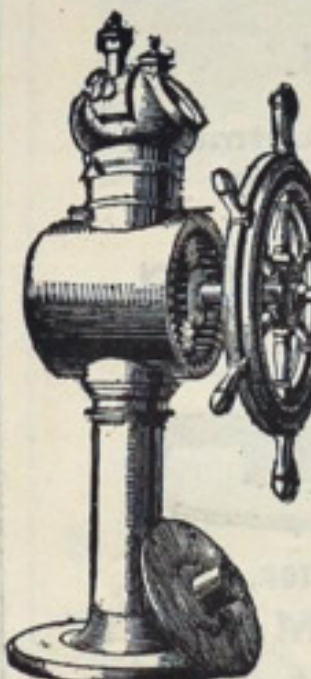
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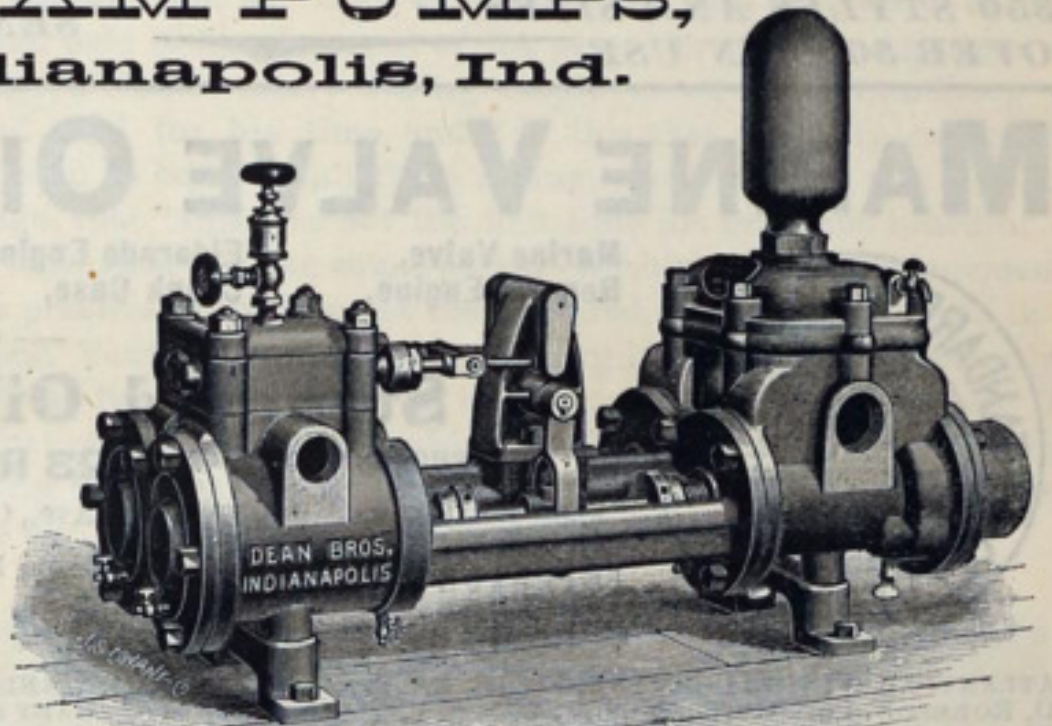
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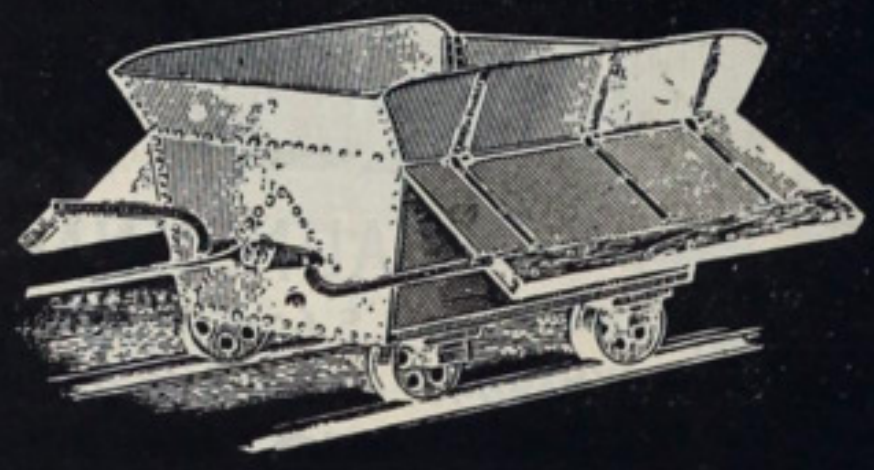
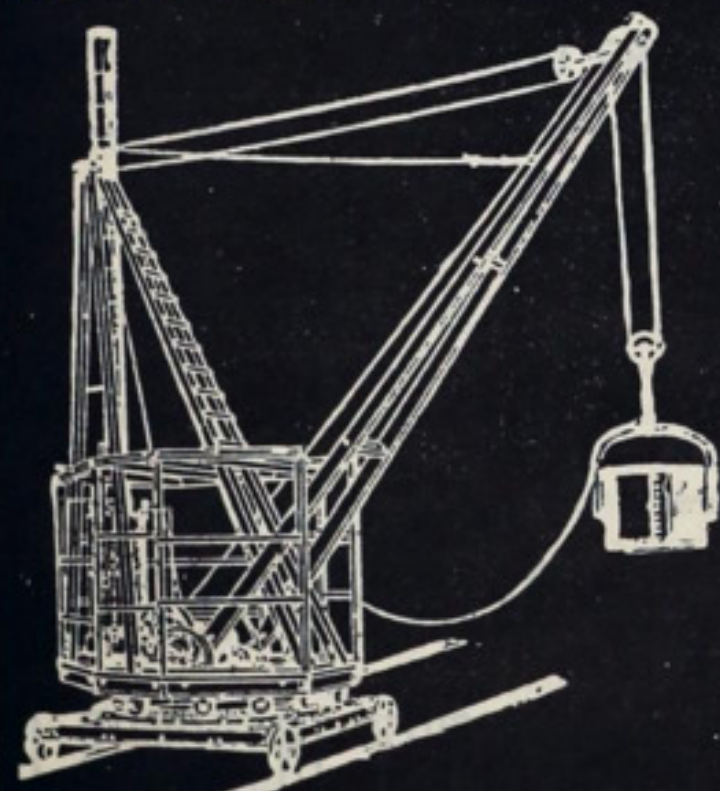
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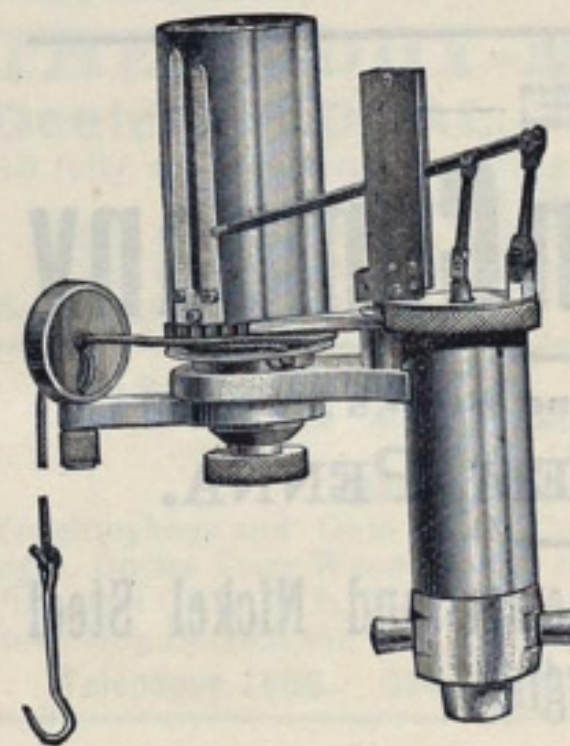
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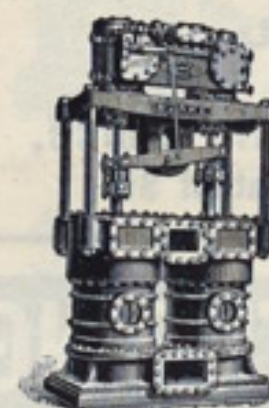
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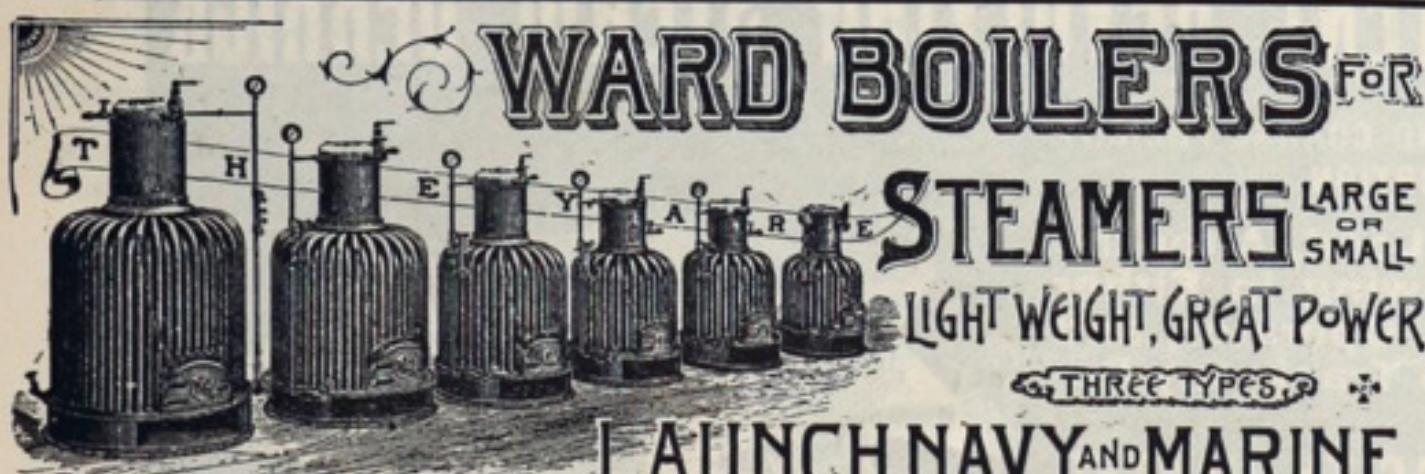


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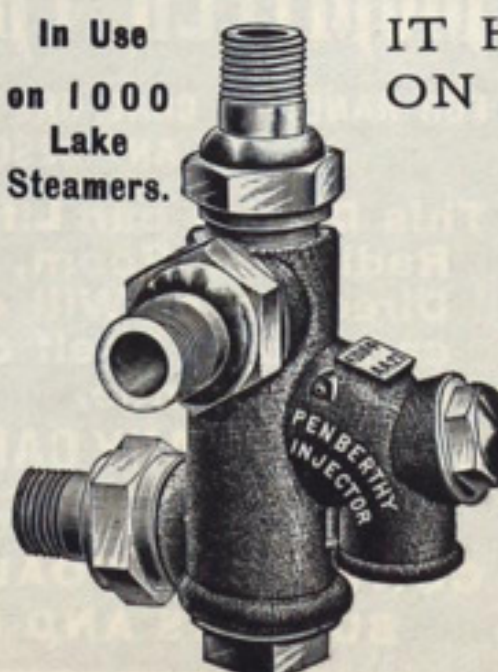


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